**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

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| SAINT LAWRENCE COMMUNICATIONS, LLC, | § § § | |
| Plaintiff, | § § | Case No. 2:19-cv-00027 |
| v. | § § | Jury Trial Demanded |
| AMAZON.COM, INC. AND AMAZON.COM LLC, | § § § | |
| Defendants. | § § | |

**SAINT LAWRENCE COMMUNICATIONS, LLC'S
COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Saint Lawrence Communications, LLC ("St. Lawrence" or "Plaintiff") hereby submits this Complaint against Defendants Amazon.com, Inc. and Amazon.com LLC ("Amazon" or "Defendants") and states as follows:

## THE PARTIES

1.      St. Lawrence is a Texas limited liability company, having a principal place of business at 6136 Frisco Square Blvd., Suite 400, Frisco, Texas 75034.

2.      On information and belief, Defendants Amazon.com, Inc. is a corporation organized and existing under the laws of the state of Delaware, having a principal place of business at 410 Terry Avenue North, Seattle, Washington 98109-5210.

3.      On information and belief, Defendants Amazon.com LLC is a corporation organized and existing under the laws of the state of Delaware, which is headquartered at 410 Terry Avenue North, Seattle, Washington 98109-5210.

4.      On information and belief, Amazon.com, Inc. is the ultimate parent of Amazon.com LLC.

## JURISDICTION AND VENUE

5.      This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, 35 U.S.C. §§ 101 *et seq.*

6.      Venue is proper in this federal district pursuant to 28 U.S.C. §1400(b).

7.      Defendants Amazon.com, Inc. and Amazon.com LLC, collectively referred to as "Amazon", own and operate fulfillment centers in this district and throughout Texas.

8.      Amazon maintains regular and established physical places of business in this District.

9.      Amazon has employees in this District.

10.     Amazon has admitted that it operates a fulfillment center within this district.[1]

11.     Amazon has admitted that it employs information technology personnel at its fulfillment center in Denton County, which is in this District.[2]

12.     Amazon has property in Denton County which is valued at $536,994.00[3] and $178,825,304.00[4].

13.     Amazon operates a facility at 1649 W. Frankford Rd., Carrollton, Texas 75007.

14.     Amazon operates a fulfillment center in Denton County at 15201 Heritage Parkway, Fort Worth, Texas 76177.

15.     Amazon offers its products and/or services, including those accused herein of infringement, to customers and potential customers located in Texas and in this District.

## SUMMARY

16.     VoiceAge Corporation ("VoiceAge") has been a pioneer in speech and audio compression technologies since its creation in 1999.  VoiceAge is widely recognized as the world's leader in developing cutting-edge technologies for wideband, low bit rate speech and audio compression.[5]   For example, VoiceAge provided the core technologies for at least nine international speech and audio standards-based codecs used in both wireless and wireline markets and applications.   VoiceAge's patented technologies have won every international audio compression standard to which they have been submitted during the last thirteen years, including to the Third Generation Partnership Project ("3GPP"), 3GPP2, the International

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[1] *See* Exhibit A at ¶¶ 7 and 16.
[2] Id at ¶ 20.
[3] https://www.dentoncad.com/api/export/pdf/details/659411?year=2018
[4] https://www.dentoncad.com/api/export/pdf/details/699143?year=2018
[5] VoiceAge was also a leader in narrow-band codecs and innovation.

Telecommunications Union ("ITU"), the European Telecommunications Standards Institute ("ETSI"), and the Motion Picture Experts Group ("MPEG") of the International Organization for Standardization ("ISO").

17.     One of the international standards based on the patented technologies of VoiceAge is the Adaptive Multi-Rate-Wideband ("AMR-WB") standard for wideband speech.  AMR-WB is a wideband speech coding standard which, among other features, provides significantly improved speech quality at a wider speech bandwidth when compared to narrowband speech coding. AMR-WB is codified as an international standard, including as 3GPP TS 26.190, which was promulgated as a standard speech codec by 3GPP.[6] The same codec was adopted by the ITU Telecommunication Standardization Sector ("ITU-T") as the "Wideband coding of speech at around 16 kbit/s using Adaptive Multi-Rate Wideband (AMR-WB)," also known as G.722.2

18.     Several speech codecs competed to serve as the foundation for AMR-WB before the standard was officially adopted by 3GPP. VoiceAge's competitors included candidate codecs developed by such industry heavyweights as Ericsson, Amazon, Texas Instruments, and a consortium comprised of France Telecom, Deutsche Telecom, Nortel Networks, and Siemens.[7] The selection process was rigorous and extensive, involving numerous experiments covering all applications defined for AMR-WB.  During the testing, the VoiceAge codec was the only codec to have no failures in any test condition.  The VoiceAge codec was the superior codec with respect to speech quality, technical considerations, and test results, and was the codec chosen to be the official AMR-WB standard.  VoiceAge had several patent families, each of which was filed prior to the adoption of the standard, and which are essential to the AMR-WB standard.[8]  Through the

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[6] There have been numerous versions or releases of 3GPP TS 26.190 to date, but each of these practices VoiceAge's patented technologies.
[7] VoiceAge worked with Nokia during the standard-selection process.
[8] VoiceAge also had patents essential to AMR-WB standard issued in numerous international jurisdictions.

processes regularly managed by the W-CDMA patent pool, each patent was also independently evaluated by the International Patent Evaluation Consortium (IPEC) and determined to be essential to the AMR-WB standard.  This evaluation by IPEC was conducted by an Evaluation Panel comprising a lead Evaluator and two Assistant Evaluators (all three are patent attorneys).  The IPEC output documentation consisted of a detailed report of the patent essentiality determination including claim charts and an IPEC certificate of essentiality.

19.     The AMR-WB standardized codec serves a variety of important, growing markets and applications including, but not limited to, high-definition voice services ("HD Voice") in wireless telephony, content for media audio, and mobile voice over internet protocol ("VoIP"). AMR-WB extends audio bandwidth to 50-7000 Hz, materially improving intelligibility over the narrow-band codec prevalent in mobile telephony.

20.     There are numerous benefits to the users of AMR-WB.  These include, but are not limited to, the following:

- Sound quality is greatly improved;
- It is easier to recognize voices and comprehend accented speech;
- It is easier to distinguish confusing or similar sounds, such as between 's' and 'f';
- It is easier to hear faint voices and to understand speakers in environments in which multiple speakers are speaking at the same time;
- Listening is easier and more life-like, resulting in less "listener fatigue" and reducing miscommunications and misunderstandings;
- It is easier to understand speakers who use a speakerphone or who are in the presence of background noise; and
- It is easier to distinguish and differentiate between multiple voices on a single call.

21.     As HD Voice and AMR-WB began to proliferate across the United States and internationally, VoiceAge partnered under an agreement with St. Lawrence to protect and license its patented inventions and intellectual property.

22.     This Court is familiar with the Patents-in-Suit, and has presided over several litigations involving the Patents-in-Suit, including *Saint Lawrence Communications LLC v. Apple*

*Inc., et al*; Case No. 2:16-cv-00082-JRG; *Saint Lawrence Communications LLC v. ZTE Corporation, et al*; Case No. 2:15-cv-00349-JRG; *Saint Lawrence Communications LLC v. Motorola Mobility LLC*; Case No. 2:15-cv-00351-JRG; *Saint Lawrence Communications LLC v. HTC Corporation, et al*; Case No. 2:15-cv-00919-JRG; *HTC Corporation, et al v. Acacia Research Corporation, et al*; Case No. 2:15-cv-01510-JRG; and *Saint Lawrence Communications LLC v. LG Electronics, Inc., et al*; Case No. 2:14-cv-01055-JRG.

23.    The Court has issued two *Markman* opinions relating to the Patents-in-Suit and presided over a jury trial relating to the Patents-in-Suit.

24.    Amazon was aware of the patents asserted here prior to the filing of this Complaint, including through the following:

- public information about these patents, the AMR-WB standard, and licenses of these patents;

- a prior settlement and license agreement between Saint Lawrence, Saint Lawrence Communications GMBH and Amazon.com, Inc.[9];

- litigation regarding related patents in Germany against Deutsche Telekom involving, in part, Amazon products sold in Germany; and

- litigation regarding the Patents-in-Suit in the United States.

25.    On information and belief, Amazon was aware of the patents asserted in this Complaint at least as early as February 26, 2015, as a result of communications between St. Lawrence and Amazon.

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[9] https://acaciaresearch.com/wp-content/uploads/2017/06/8-K-filed-4-22-15-SLC-LLCGMBH-Amazon-1.pdf

26.     Amazon is not currently licensed to the patents asserted in this Complaint with respect to the activities accused of infringement; yet, Amazon knowingly, actively, and lucratively practices and induces others to practice the patents.

**COUNT I: INFRINGEMENT OF U.S. PATENT NO. 6,795,805**

27.     On September 21, 2004, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 6,795,805 ("the '805 Patent"), entitled "Periodicity Enhancement in Decoding Wideband Signals."  St. Lawrence is the owner of the '805 Patent, and has the right to license products practicing the AMR-WB standard.

28.     Upon information and belief, Amazon has infringed directly and continues to infringe directly the '805 Patent.  The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale within the United States of products practicing the AMR-WB Standard (the "Amazon AMR-WB Products").

29.     Amazon AMR-WB Products include at least the Fire Phone[10], Fire TV Gen 1 (2014), Fire TV Gen 2 (2015), Fire TV Gen 3 (2017), Fire TV Stick Gen 1 (2014), Fire TV Stick Gen 2 (2016), Fire TV Stick – Basic Edition (2017), Fire TV Edition – Element Smart TV (2017)[11], Fire TV Cube (2018), Fire TV Stick 4K (2018), Fire TV Edition – Insignia HD (2018), Fire TV Edition – Insignia 4K (2018), Fire TV Edition – Toshiba HD (2018), and Fire TV Edition – Toshiba 4K (2018)[12] which all support AMR-WB.

30.     Amazon AMR-WB Products also include at least the Kindle Fire (2011), Kindle Fire (2012), Kindle Fire HD (2012), Kindle Fire HD 8.9 (2012), Kindle Fire HD (2013), Kindle Fire HDX (2013), Kindle Fire HDX 8.9 (2013), Fire HD 6 (2014), Fire HD 7 (2014), Fire HDX

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[10] https://www.androidcentral.com/amazon-fire-phone-specs
[11] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[12] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications

8.9 (2014), Fire (2015), Fire HD 8 (2015), Fire HD 10 (2015), Fire HD 8 (2016), Fire 7 (2017), Fire HD 8 (2017), Fire HD 10 (2017), and Fire HD 8 (2018)[13] which all support AMR-WB.

31.      On information and belief, several of the Amazon AMR-WB Products are based upon the Android Operating System ("Android OS").  Starting with Android 2.3, the Android OS supported AMR-WB.[14]  On information and belief, Amazon incorporated this feature into its own Operating System.  *See* Exhibit B.  Thus, any Amazon product that runs an operating system that is based on Android 2.3 or higher is an Amazon AMR-WB Product.

32.      On information and belief, the devices listed above are among a larger range of Amazon AMR-WB Products, each of which practices the '805 patent. For example, to the extent that Alexa-enabled products such as the Echo (1st and 2nd Generation), Echo Dot (1st, 2nd and 3rd Generation), Echo Plus (1st and 2nd Generation), Echo Dot Kids Edition, Echo Spot, Echo Show (1st and 2nd Generation), Echo Look, Echo Auto or other Echo or Alexa-enabled products support AMR-WB, those products would be accused Amazon AMR-WB Products. On information and belief, the Echo (1st and 2nd Generation), Echo Dot (1st and 2nd Generation), Echo Plus, Echo Dot Kids Edition, Echo Spot, Echo Show, and/or Echo Look run on Fire OS, which is based on Android OS, and/or Android OS and thus support AMR-WB[15].

33.      As alleged above, Amazon had actual notice of the patents asserted here and of its infringement of these patents.

34.      The Amazon AMR-WB Products directly infringe the '805 patent.

35.      For example, the Amazon AMR-WB Products practice representative Claim 3 from U.S. Patent No. 6,795,805.  Claim 3 discloses a device for enhancing periodicity of an excitation

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[13] https://developer.amazon.com/docs/fire-tablets/ft-device-and-feature-specifications.html;
https://developer.amazon.com/blogs/appstore/post/Tx1QVJIZG2Y4SJ8/kindle-fire-and-your-app-s-part-ii
[14] https://developer.android.com/about/versions/android-2.3-highlights
[15] https://liliputing.com/2017/05/fun-fact-amazons-echo-devices-run-android-based-os.html

signal produced in relation to a pitch codevector and an innovative codevector for supplying a signal synthesis filter in view of synthesizing a wideband speech signal comprising a factor generator for calculating a periodicity factor related to the wideband speech signal; an innovation filter for filtering the innovative codevector in relation to said periodicity factor to thereby reduce energy of a low frequency portion of the innovative codevector and enhance periodicity of a low frequency portion of the excitation signal.  Claim 3 further discloses that the innovation filter has a transfer function of the form $F(z) = -\alpha z + 1 - \alpha z^{-1}$ where $\alpha$ is a periodicity factor derived from a level of periodicity of the excitation signal.

Each of the Accused Products includes the AMR-WB codec, which comprises the disclosed device for enhancing periodicity of representative Claim 3.  The AMR-WB codec processes a speech signal sampled at 16,000 samples/second (i.e., a wideband signal). *See* TS 26.190 at 6. This codec includes a device for enhancing periodicity of an excitation signal produced in relation to a pitch (or adaptive) codebook vector and an innovative (or fixed) codebook vector. For example, Section 4.4 of 3GPP TS 26.190 describes that the excitation is constructed by adding the adaptive and innovative codevectors scaled by their respective gains.  The excitation is filtered through the LP synthesis filter in order to reconstruct the wideband speech signal.

The periodicity enhancement device includes a factor generator for calculating a periodicity factor related to the wideband speech signal.  For example, Section 6.1 of 3GPP TS 26.190 describes calculating $r_v = (E_v - E_c)/(E_v + E_c)$, where $E_v$ and $E_c$ are the energies of the scaled pitch codevector and scaled innovation codevector, respectively.  This ratio $rv$ is used to calculate the periodicity factor $c_{pe} = 0.125(1 + r_v)$.  This periodicity factor corresponds to a value of 0 for purely unvoiced signals and a value of 0.25 for purely voiced signals.

Section 6.1 of 3GPP TS 26.190 further describes that a pitch enhancer procedure modifies the total excitation u(n) by filtering the fixed codebook excitation through an innovation filter of the form $F_{inno}(z) = -c_{pe}z + 1 - c_{pe}z^{-1}$ using the periodicity factor $c_{pe}$ which is derived from a level of periodicity of the excitation signal. This filter's frequency response emphasizes the higher frequencies more than the lower frequencies by reducing the low frequency content in proportion to the periodicity of the decoded signal.  As a result, in cases of voiced speech, this filter will reduce the energy of the low frequency portion of the innovative codevector and thereby enhance the periodicity of the low frequency portion of the excitation signal.

36.     In addition to its direct infringement, Amazon has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the method claims of the '805 patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing Amazon AMR-WB Products, covered by one or more method claims of the '805 patent, all to the injury of St. Lawrence.  In the case of such infringement, the users of the Amazon AMR-WB Products are the direct infringers of the '805 patent.  Amazon advertises and promotes its Amazon AMR-WB Products on its website.[16]  Amazon provides, makes, uses, licenses, sells, and offers its Amazon AMR-WB Products for sale with the specific intent that its customers use those devices in an infringing manner.[17] Amazon sells or offers to sell its Amazon AMR-WB Products for use in practicing St. Lawrence's patented processes.  The AMR-WB features have no substantial non-infringing uses, and are known by Amazon to be especially made or especially adapted for use in an infringement of St. Lawrence's patents by complying with the

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[16]https://www.amazon.com/Amazon-Fire-TV-Family;  https://www.amazon.com/Amazon-Fire-Tablet-Family
[17] https://developer.amazon.com/blogs/home/tag/features;  https://www.amazon.com/Stick-Alexa-Voice-Remote-White/dp/B075911H6L

AMR-WB standard. Amazon's acts of infringement have been willful, deliberate, and in reckless disregard of St. Lawrence's patent rights.

37.     The acts of infringement by Amazon have caused damage to St. Lawrence, and St. Lawrence is entitled to recover from Amazon the damages sustained by St. Lawrence as a result of Amazon's wrongful acts in an amount subject to proof at trial.   The infringement of St. Lawrence's exclusive rights under the '805 Patent by Amazon has damaged and will continue to damage St. Lawrence.

38.     Upon information and belief, Amazon actually knew of, or was willfully blind to, the existence of the '805 Patent, yet Amazon continues to infringe said patent. For that reason and the reasons described above, the infringement of the '805 Patent by Amazon is willful and deliberate, and with full knowledge of the patent, entitling St. Lawrence to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

### COUNT II: INFRINGEMENT OF U.S. PATENT NO. 6,807,524

39.     On October 19, 2004, the USPTO duly and legally issued United States Patent No. 6,807,524 ("the '524 Patent"), entitled "Perceptual Weighting Device and Method for Efficient Coding of Wideband Signals."   St. Lawrence is the owner of the '524 Patent, and has all rights to license products practicing the AMR-WB standard.

40.     Upon information and belief, Amazon has infringed directly and continues to infringe directly the '524 Patent.   The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale within the United States of products practicing the AMR-WB Standard ("the Amazon AMR-WB Products").

41.     Amazon AMR-WB Products include at least the Fire Phone[18], Fire TV Gen 1 (2014), Fire TV Gen 2 (2015), Fire TV Gen 3 (2017), Fire TV Stick Gen 1 (2014), Fire TV Stick Gen 2 (2016), Fire TV Stick – Basic Edition (2017), Fire TV Edition – Element Smart TV (2017)[19], Fire TV Cube (2018), Fire TV Stick 4K (2018), Fire TV Edition – Insignia HD (2018), Fire TV Edition – Insignia 4K (2018), Fire TV Edition – Toshiba HD (2018), and Fire TV Edition – Toshiba 4K (2018)[20] which all support AMR-WB.

42.     Amazon AMR-WB Products also include at least the Kindle Fire (2011), Kindle Fire (2012), Kindle Fire HD (2012), Kindle Fire HD 8.9 (2012), Kindle Fire HD (2013), Kindle Fire HDX (2013), Kindle Fire HDX 8.9 (2013), Fire HD 6 (2014), Fire HD 7 (2014), Fire HDX 8.9 (2014), Fire (2015), Fire HD 8 (2015), Fire HD 10 (2015), Fire HD 8 (2016), Fire 7 (2017), Fire HD 8 (2017), Fire HD 10 (2017), and Fire HD 8 (2018)[21] which all support AMR-WB.

43.     On information and belief, several of the Amazon AMR-WB Products are based upon the Android Operating System ("Android OS").  Starting with Android 2.3, the Android OS supported AMR-WB.[22]  On information and belief, Amazon incorporated this feature into its own Operating System. *See* Exhibit B.  Thus, any Amazon product that runs an operating system that is based on Android 2.3 or higher is an Amazon AMR-WB Product.

44.     On information and belief, the devices listed above are among a larger range of Amazon AMR-WB Products, each of which practices the '805 patent. For example, to the extent that Alexa-enabled products such as the Echo (1st and 2nd Generation), Echo Dot (1st, 2nd and 3rd Generation), Echo Plus (1st and 2nd Generation), Echo Dot Kids Edition, Echo Spot, Echo Show

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[18] https://www.androidcentral.com/amazon-fire-phone-specs
[19] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[20] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[21] https://developer.amazon.com/docs/fire-tablets/ft-device-and-feature-specifications.html;
https://developer.amazon.com/blogs/appstore/post/Tx1QVJIZG2Y4SJ8/kindle-fire-and-your-app-s-part-ii
[22] https://developer.android.com/about/versions/android-2.3-highlights

(1st and 2nd Generation), Echo Look, Echo Auto or other Echo or Alexa-enabled products support AMR-WB, those products would be accused Amazon AMR-WB Products. On information and belief, the Echo (1st and 2nd Generation), Echo Dot (1st and 2nd Generation), Echo Plus, Echo Dot Kids Edition, Echo Spot, Echo Show, and/or Echo Look run on Fire OS, which is based on Android OS, and/or Android OS and thus support AMR-WB[23].

45.     As alleged above, Amazon had actual notice of the patents asserted here and of its infringement of these patents.

46.     The Amazon AMR-WB Products directly infringe the '524 Patent.

47.     For example, the Amazon AMR-WB Products practice representative Claim 4 from U.S. Patent No. 6,807,524.  Claim 4 discloses a perceptual weighting device for producing a perceptually weighted signal in response to a wideband speech signal in order to reduce a difference between the wideband speech signal and a subsequently synthesized wideband speech signal, said perceptual weighting device comprising: (a) a signal preemphasis filter responsive to the wideband speech signal for enhancing a high frequency content of the wideband speech signal to thereby produce a preemphasised signal; (b) a synthesis filter calculator responsive to said preemphasised signal for producing synthesis filter coefficients; and (c) a perceptual weighting filter, responsive to said preemphasised signal and said synthesis filter coefficients, for filtering said preemphasised signal in relation to said synthesis filter coefficients to thereby produce said perceptually weighted signal, said perceptual weighting filter having a transfer function with fixed denominator whereby weighting of said wideband speech signal in a formant region is substantially decoupled from a spectral tilt of said wideband speech signal.  Claim 4 further discloses that said signal preemphasis filter has a transfer function of the form $P(z) = 1 - \mu z^{-1}$,

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[23] https://liliputing.com/2017/05/fun-fact-amazons-echo-devices-run-android-based-os.html

where μ is a preemphasis factor having a value located between 0 and 1, and said perceptual weighting filter has a transfer function of the form $W(z) = A(z/\gamma_1)/(1 - \gamma_2 z^{-1})$, where $0 < \gamma_2 < \gamma_1 \leq 1$ and $\gamma_2$ and $\gamma_1$ are weighting control values.

Each of the Accused Products includes the AMR-WB codec, which comprises the disclosed perceptual weighting device of representative Claim 4.  The AMR-WB codec operates on speech signals that are sampled at 16,000 Hz and then down-sampled to 12,800 Hz for processing (i.e., wideband signals).  In wideband signals, the spectral tilt is typically more pronounced given the wider dynamic range between the lower and higher frequency ranges.  As a result, in order to address the spectral tilt, the wideband signal is pre-emphasized using a signal preemphasis filter of the form $1 - \mu z^{-1}$, which enhances the higher frequency content of the wideband speech signal and produces a preemphasised signal.  For example, the AMR-WB codec uses a value of 0.68, which is a value located between 0 and 1, as the preemphasis factor μ.  A discussion of this preemphasis process can be found in Sections 4.3 and 5.1 of 3GPP TS 26.190, which is the technical specification for the AMR-WB transcoding functions.  The AMR-WB codec also includes a synthesis filter calculator, which analyzes the preemphasised signal to extract the linear prediction filter coefficients using, for example, autocorrelation and the Levinson-Durbin algorithm.  A discussion of this process can be found in Sections 4.3 and 5.2 of 3GPP TS 26.190.  The AMR-WB codec further includes a perceptual weighting filter of the form $A(z/\gamma_1)/(1 - \gamma_2 z^{-1})$, which produces a perceptually weighted signal based upon the wideband signal and the extracted linear prediction filter coefficients.  For example, the AMR-WB codec uses weighting control values of $\gamma_1 = 0.92$ and $\gamma_2 = 0.68$, which satisfies the relationship of $0 < \gamma_2 < \gamma_1 \leq 1$.  Furthermore, the denominator of the perceptual weighting filter, $1 - \gamma_2 z^{-1}$, is a fixed denominator that does not

vary in time with the $a_i$ parameters.  As explained in Section 5.3 of 3GPP TS 26.190, the use of a fixed denominator substantially decouples the formant weighting from the spectral tilt.

48.     In addition to its direct infringement, Amazon has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the method claims of the '524 patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing Amazon AMR-WB Products, covered by one or more method claims of the '524 patent, all to the injury of St. Lawrence.  In the case of such infringement, the users of the Amazon AMR-WB Products are the direct infringers of the '524 patent.  Amazon advertises and promotes its Amazon AMR-WB Products on its website.[24]  Amazon provides, makes, uses, licenses, sells, and offers its Amazon AMR-WB Products for sale with the specific intent that its customers use those devices in an infringing manner.[25] Amazon sells or offers to sell its Amazon AMR-WB Products for use in practicing St. Lawrence's patented processes, and those are material to practicing St. Lawrence's invention.  The AMR-WB features have no substantial non-infringing uses, and are known by Amazon to be especially made or especially adapted for use in an infringement of St. Lawrence's patents by complying with the AMR-WB standard. Amazon's acts of infringement have been willful, deliberate, and in reckless disregard of St. Lawrence's patent rights.

49.     The acts of infringement by Amazon have caused damage to St. Lawrence, and St. Lawrence is entitled to recover from Amazon the damages sustained by St. Lawrence as a result of Amazon's wrongful acts in an amount subject to proof at trial.  The infringement of St.

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[24] https://www.amazon.com/Amazon-Fire-TV-Family;  https://www.amazon.com/Amazon-Fire-Tablet-Family
[25] https://developer.amazon.com/blogs/home/tag/features;  https://www.amazon.com/Stick-Alexa-Voice-Remote-White/dp/B075911H6L

Lawrence's exclusive rights under the '524 Patent by Amazon has damaged and will continue to damage St. Lawrence.

50.     Upon information and belief, Amazon actually knew of, or was willfully blind to, the existence of the '524 Patent, yet Amazon continues to infringe said patent. For that reason and the reasons described above, the infringement of the '524 Patent by Amazon is willful and deliberate, and with full knowledge of the patent, entitling St. Lawrence to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

### COUNT III: INFRINGEMENT OF U.S. PATENT NO. 7,151,802

51.     On December 19, 2006, the USPTO duly and legally issued United States Patent No. 7,151,802 ("the '802 Patent"), entitled "High Frequency Content Recovering Method and Device for Over-Sampled Synthesized Wideband Signal."  St. Lawrence is the owner of the '802 Patent, and has all rights to license products practicing the AMR-WB standard.

52.     Upon information and belief, Amazon has infringed directly and continues to infringe directly the '802 Patent.  The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale within the United States of products practicing the AMR-WB Standard ("the Amazon AMR-WB Products").

53.     Amazon AMR-WB Products include at least the Fire Phone[26], Fire TV Gen 1 (2014), Fire TV Gen 2 (2015), Fire TV Gen 3 (2017), Fire TV Stick Gen 1 (2014), Fire TV Stick Gen 2 (2016), Fire TV Stick – Basic Edition (2017), Fire TV Edition – Element Smart TV (2017)[27], Fire TV Cube (2018), Fire TV Stick 4K (2018), Fire TV Edition – Insignia HD (2018), Fire TV

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[26] https://www.androidcentral.com/amazon-fire-phone-specs
[27] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications

Edition – Insignia 4K (2018), Fire TV Edition – Toshiba HD (2018), and Fire TV Edition – Toshiba 4K (2018)[28] which all support AMR-WB.

54.     Amazon AMR-WB Products also include at least the Kindle Fire (2011), Kindle Fire (2012), Kindle Fire HD (2012), Kindle Fire HD 8.9 (2012), Kindle Fire HD (2013), Kindle Fire HDX (2013), Kindle Fire HDX 8.9 (2013), Fire HD 6 (2014), Fire HD 7 (2014), Fire HDX 8.9 (2014), Fire (2015), Fire HD 8 (2015), Fire HD 10 (2015), Fire HD 8 (2016), Fire 7 (2017), Fire HD 8 (2017), Fire HD 10 (2017), and Fire HD 8 (2018)[29] which all support AMR-WB.

55.     On information and belief, several of the Amazon AMR-WB Products are based upon the Android Operating System ("Android OS").  Starting with Android 2.3, the Android OS supported AMR-WB.[30]  On information and belief, Amazon incorporated this feature into its own Operating System.  *See* Exhibit B.  Thus, any Amazon product that runs an operating system that is based on Android 2.3 or higher is an Amazon AMR-WB Product.

56.     On information and belief, the devices listed above are among a larger range of Amazon AMR-WB Products, each of which practices the '805 patent. For example, to the extent that Alexa-enabled products such as the Echo (1st and 2nd Generation), Echo Dot (1st, 2nd and 3rd Generation), Echo Plus (1st and 2nd Generation), Echo Dot Kids Edition, Echo Spot, Echo Show (1st and 2nd Generation), Echo Look, Echo Auto or other Echo or Alexa-enabled products support AMR-WB, those products would be accused Amazon AMR-WB Products. On information and belief, the Echo (1st and 2nd Generation), Echo Dot (1st and 2nd Generation), Echo Plus, Echo Dot

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[28] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[29] https://developer.amazon.com/docs/fire-tablets/ft-device-and-feature-specifications.html;
https://developer.amazon.com/blogs/appstore/post/Tx1QVJIZG2Y4SJ8/kindle-fire-and-your-app-s-part-ii
[30] https://developer.android.com/about/versions/android-2.3-highlights

Kids Edition, Echo Spot, Echo Show, and/or Echo Look run on Fire OS, which is based on Android

OS, and/or Android OS and thus support AMR-WB[31].

57.     As alleged above, Amazon had actual notice of the patents asserted here and of its

infringement of these patents.

58.     The Amazon AMR-WB Products directly infringe the '802 patent.

59.     For example, the Amazon AMR-WB Products practice representative Claim 1 from

U.S. Patent No. 7,151,802.  Claim 1 discloses a decoder for producing a synthesized wideband

signal, comprising: a) a signal fragmenting device for receiving an encoded version of a wideband

signal previously down-sampled during encoding and extracting from said encoded wideband

signal version at least pitch codebook parameters, innovative codebook parameters, and linear

prediction filter coefficients; b) a pitch codebook responsive to said pitch codebook parameters for

producing a pitch codevector; c) an innovative codebook responsive to said innovative codebook

parameters for producing an innovative codevector; d) a combiner circuit for combining said pitch

codevector and said innovative codevector to thereby produce an excitation signal; e) a signal

synthesis device including a linear prediction filter for filtering said excitation signal in relation to

said linear prediction filter coefficients to thereby produce a synthesized wideband signal, and an

oversampler responsive to said synthesized wideband signal for producing an over-sampled signal

version of the synthesized wideband signal; and f) a high-frequency content recovering device.

This high-frequency content recoverin device further comprises: i) a random noise generator for

producing a noise sequence having a given spectrum; ii) a spectral shaping unit for shaping the

spectrum of the noise sequence in relation to linear prediction filter coefficients related to said

down-sampled wideband signal; and iii) a signal injection circuit for injecting said spectrally-

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[31] https://liliputing.com/2017/05/fun-fact-amazons-echo-devices-run-android-based-os.html

shaped noise sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal.

Each of the Accused Products includes the AMR-WB codec, which comprises the disclosed decoder of representative Claim 1.  The AMR-WB codec processes a wideband signal and performs down-sampling from a sampling rate of 16,000 Hz to 12,800 Hz.  The AMR-WB codec further includes a signal fragmenting device that extracts, for example, the LP filter coefficients and the adaptive and fixed codebooks' indices and gains on a subframe basis.  Section 6.1 of 3GPP TS 26.190 describes that the received pitch index is used to find the adaptive (pitch) codebook vector and the received innovative index is used to find the algebraic (or innovative) codebook vector corresponding to each subframe of speech.  Section 6.1 further explains that the pitch codevector and the innovative codevector are combined to produce an excitation signal.  The excitation signal is filtered by a linear prediction filter using the LP filter coefficients in order to create a synthesized wideband speech signal.  As explained in Section 6.2 of 3GPP TS 26.190, the reconstructed speech signal is up sampled from the sampling rate of 12,800 Hz to 16,000 Hz, producing an oversampled synthesized signal.

Section 6.3 of 3GPP TS 26.190 further describes the high-frequency content recovering device disclosed in Claim 1.  This includes generating random white noise with a noise generator and then filtering this white noise through a high-band LP synthesis filter $A_{HB}(z)$, which shapes the noise in relation to the linear prediction filter coefficients corresponding to the down-sampled wideband signal.  The output of this high-band synthesis process is band-pass filtered and then added to the oversampled synthesized signal in order to produce a full-spectrum synthesized wideband signal

60.     In addition to its direct infringement, Amazon has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the method claims of the '802 patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing Amazon AMR-WB Products, covered by one or more method claims of the '802 patent, all to the injury of St. Lawrence.  In the case of such infringement, the users of the Amazon AMR-WB Products are the direct infringers of the '802 patent.  Amazon advertises and promotes its Amazon AMR-WB Products on its website.[32]   Amazon provides, makes, uses, licenses, sells, and offers its Amazon AMR-WB Products for sale with the specific intent that its customers use those devices in an infringing manner.[33] Amazon sells or offers to sell its Amazon AMR-WB Products for use in practicing St. Lawrence's patented processes, and those are material to practicing St. Lawrence's invention.  The AMR-WB features have no substantial non-infringing uses, and are known by Amazon to be especially made or especially adapted for use in an infringement of St. Lawrence's patents by complying with the AMR-WB standard. Amazon's acts of infringement have been willful, deliberate, and in reckless disregard of St. Lawrence's patent rights.

61.     The acts of infringement by Amazon have caused damage to St. Lawrence, and St. Lawrence is entitled to recover from Amazon the damages sustained by St. Lawrence as a result of Amazon's wrongful acts in an amount subject to proof at trial.  The infringement of St. Lawrence's exclusive rights under the '802 Patent by Amazon has damaged and will continue to damage St. Lawrence.

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[32]https://www.amazon.com/Amazon-Fire-TV-Family;  https://www.amazon.com/Amazon-Fire-Tablet-Family
[33] https://developer.amazon.com/blogs/home/tag/features;  https://www.amazon.com/Stick-Alexa-Voice-Remote-White/dp/B075911H6L

62.     Upon information and belief, Amazon actually knew of, or was willfully blind to, the existence of the '802 Patent, yet Amazon continues to infringe said patent. For that reason and the reasons described above, the infringement of the '802 Patent by Amazon is willful and deliberate, and with full knowledge of the patent, entitling St. Lawrence to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

## COUNT IV: INFRINGEMENT OF U.S. PATENT NO. 7,260,521

63.     On August 21, 2007, the USPTO duly and legally issued United States Patent No. 7,260,521 ("the '521 Patent"), entitled "Method and Device for Adaptive Bandwidth Pitch Search in Coding Wideband Signals."  St. Lawrence is the owner of the '521 Patent, and has all rights to license products practicing the AMR-WB standard.

64.     Upon information and belief, Amazon has infringed directly and continues to infringe directly the '521 Patent.  The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale within the United States of products practicing the AMR-WB Standard ("the Amazon AMR-WB Products").

65.     Amazon AMR-WB Products include at least the Fire Phone[34], Fire TV Gen 1 (2014), Fire TV Gen 2 (2015), Fire TV Gen 3 (2017), Fire TV Stick Gen 1 (2014), Fire TV Stick Gen 2 (2016), Fire TV Stick – Basic Edition (2017), Fire TV Edition – Element Smart TV (2017)[35], Fire TV Cube (2018), Fire TV Stick 4K (2018), Fire TV Edition – Insignia HD (2018), Fire TV Edition – Insignia 4K (2018), Fire TV Edition – Toshiba HD (2018), and Fire TV Edition – Toshiba 4K (2018)[36] which all support AMR-WB.

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[34] https://www.androidcentral.com/amazon-fire-phone-specs
[35] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[36] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications

66.     Amazon AMR-WB Products also include at least the Kindle Fire (2011), Kindle Fire (2012), Kindle Fire HD (2012), Kindle Fire HD 8.9 (2012), Kindle Fire HD (2013), Kindle Fire HDX (2013), Kindle Fire HDX 8.9 (2013), Fire HD 6 (2014), Fire HD 7 (2014), Fire HDX 8.9 (2014), Fire (2015), Fire HD 8 (2015), Fire HD 10 (2015), Fire HD 8 (2016), Fire 7 (2017), Fire HD 8 (2017), Fire HD 10 (2017), and Fire HD 8 (2018)[37] which all support AMR-WB.

67.     On information and belief, several of the Amazon AMR-WB Products are based upon the Android Operating System ("Android OS").  Starting with Android 2.3, the Android OS supported AMR-WB.[38]  On information and belief, Amazon incorporated this feature into its own Operating System.  *See* Exhibit B.  Thus, any Amazon product that runs an operating system that is based on Android 2.3 or higher is an Amazon AMR-WB Product.

68.     On information and belief, the devices listed above are among a larger range of Amazon AMR-WB Products, each of which practices the '805 patent. For example, to the extent that Alexa-enabled products such as the Echo (1st and 2nd Generation), Echo Dot (1st, 2nd and 3rd Generation), Echo Plus (1st and 2nd Generation), Echo Dot Kids Edition, Echo Spot, Echo Show (1st and 2nd Generation), Echo Look, Echo Auto or other Echo or Alexa-enabled products support AMR-WB, those products would be accused Amazon AMR-WB Products. On information and belief, the Echo (1st and 2nd Generation), Echo Dot (1st and 2nd Generation), Echo Plus, Echo Dot Kids Edition, Echo Spot, Echo Show, and/or Echo Look run on Fire OS, which is based on Android OS, and/or Android OS and thus support AMR-WB[39].

69.     As alleged above, Amazon had actual notice of the patents asserted here and of its infringement of these patents.

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[37] https://developer.amazon.com/docs/fire-tablets/ft-device-and-feature-specifications.html; https://developer.amazon.com/blogs/appstore/post/Tx1QVJIZG2Y4SJ8/kindle-fire-and-your-app-s-part-ii
[38] https://developer.android.com/about/versions/android-2.3-highlights
[39] https://liliputing.com/2017/05/fun-fact-amazons-echo-devices-run-android-based-os.html

70.     The Amazon AMR-WB Products directly infringe the '521 Patent.

71.     As another example, the Amazon AMR-WB Products practice representative Claim 2 from U.S. Patent No. 7,260,521.  Claim 2 discloses a pitch analysis device for producing a set of pitch codebook parameters comprising a pitch codebook search device configured to generate a pitch codevector based on a digitized input audio data, wherein said digitized input audio data represents an input audio signal that has been sampled and digitized.  Claim 2 further discloses at least two signal paths associated to respective sets of pitch codebook parameters representative of said digitized input audio data, wherein each signal path comprises a pitch prediction error calculating device for calculating a pitch prediction error of said pitch codevector from said pitch codebook search device, and at least one of said at least two signal paths comprises a filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device of said at least one signal path.  Claim 2 also discloses a selector for comparing the pitch prediction errors calculating in said at least two signal paths, for choosing the signal path having the lowest calculated pitch prediction error and for selecting the set of pitch codebook parameters associated to the chosen signal path.  Claim 2 further discloses one of said at least two signal paths comprises no filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device.

Each of the Accused Products includes the AMR-WB codec, which comprises the disclosed pitch analysis device of representative Claim 2.  The AMR-WB codec operates on wideband speech signals that are sampled at 16,000 Hz and digitized.  For example, Sections 4.1 and 4.2 of 3GPP TS 26.190 describe that the signal undergoes an analogue-to-uniform digital conversion to 14-bit representation and that the encoder is fed with data samples with a resolution of 14-bits left-justified in a 16-bit word.  Section 5.7 of 3GPP TS 26.190 further describes that an

adaptive codebook search is performed on a subframe basis to generate adaptive codebook parameters, including the delay and gain of the pitch filter.

The AMR-WB codec also includes two signal paths associated to respective sets of pitch codebook parameters.  Section 5.7 of 3GPP TS 26.190 states that there are two signal paths and that each signal path comprises a pitch prediction error calculating device for calculating a pitch prediction error.  For example, the calculated pitch prediction error may be expressed by the mathematical relationship $e^{(j)} = ||x - b^{(j)}y^{(j)}||^2$ where j is an index. The signal path having the lowest calculated pitch prediction error is selected, along with the associated pitch gain.   Section 5.7 of 3GPP TS 26.190 further describes that one of these two paths comprise a low-pass filter for filtering the pitch codevector.  The other path does not comprise a filter.

72.     In addition to its direct infringement, Amazon has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the method claims of the '521 patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing Amazon AMR-WB Products, covered by one or more method claims of the '521 patent, all to the injury of St. Lawrence.  In the case of such infringement, the users of the Amazon AMR-WB Products are the direct infringers of the '521 patent.  Amazon advertises and promotes its Amazon AMR-WB Products on its website.[40]  Amazon provides, makes, uses, licenses, sells, and offers its Amazon AMR-WB Products for sale with the specific intent that its customers use those devices in an infringing manner.[41] Amazon sells or offers to sell its Amazon AMR-WB Products for use in practicing St. Lawrence's patented processes, and those are material

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[40]https://www.amazon.com/Amazon-Fire-TV-Family;  https://www.amazon.com/Amazon-Fire-Tablet-Family
[41] https://developer.amazon.com/blogs/home/tag/features;  https://www.amazon.com/Stick-Alexa-Voice-Remote-White/dp/B075911H6L

to practicing St. Lawrence's invention.  The AMR-WB features have no substantial non-infringing uses, and are known by Amazon to be especially made or especially adapted for use in an infringement of St. Lawrence's patents by complying with the AMR-WB standard. Amazon's acts of infringement have been willful, deliberate, and in reckless disregard of St. Lawrence's patent rights.

73.     The acts of infringement by Amazon have caused damage to St. Lawrence, and St. Lawrence is entitled to recover from Amazon the damages sustained by St. Lawrence as a result of Amazon's wrongful acts in an amount subject to proof at trial.   The infringement of St. Lawrence's exclusive rights under the '521 Patent by Amazon has damaged and will continue to damage St. Lawrence.

74.     Upon information and belief, Amazon actually knew of, or was willfully blind to, the existence of the '521 Patent, yet Amazon continues to infringe said patent. For that reason and the reasons described above, the infringement of the '521 Patent by Amazon is willful and deliberate, and with full knowledge of the patent, entitling St. Lawrence to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

### COUNT V: INFRINGEMENT OF U.S. PATENT NO. 7,191,123

75.     On March 13, 2007, the USPTO duly and legally issued United States Patent No. 7,191,123 ("the '123 Patent"), entitled "Gain-Smoothing in Wideband Speech and Audio Signal Decoder."  St. Lawrence is the owner of the '123 Patent, and has all rights to license products practicing the AMR-WB standard.

76.     Upon information and belief, Amazon has infringed directly and continues to infringe directly the '123 Patent.   The infringing acts include, but are not limited to, the

manufacture, use, sale, importation, and/or offer for sale within the United States of products practicing the AMR-WB Standard ("the Amazon AMR-WB Products").

77.     Amazon AMR-WB Products include at least the Fire Phone[42], Fire TV Gen 1 (2014), Fire TV Gen 2 (2015), Fire TV Gen 3 (2017), Fire TV Stick Gen 1 (2014), Fire TV Stick Gen 2 (2016), Fire TV Stick – Basic Edition (2017), Fire TV Edition – Element Smart TV (2017)[43], Fire TV Cube (2018), Fire TV Stick 4K (2018), Fire TV Edition – Insignia HD (2018), Fire TV Edition – Insignia 4K (2018), Fire TV Edition – Toshiba HD (2018), and Fire TV Edition – Toshiba 4K (2018)[44] which all support AMR-WB.

78.     Amazon AMR-WB Products also include at least the Kindle Fire (2011), Kindle Fire (2012), Kindle Fire HD (2012), Kindle Fire HD 8.9 (2012), Kindle Fire HD (2013), Kindle Fire HDX (2013), Kindle Fire HDX 8.9 (2013), Fire HD 6 (2014), Fire HD 7 (2014), Fire HDX 8.9 (2014), Fire (2015), Fire HD 8 (2015), Fire HD 10 (2015), Fire HD 8 (2016), Fire 7 (2017), Fire HD 8 (2017), Fire HD 10 (2017), and Fire HD 8 (2018)[45] which all support AMR-WB.

79.     On information and belief, several of the Amazon AMR-WB Products are based upon the Android Operating System ("Android OS").  Starting with Android 2.3, the Android OS supported AMR-WB.[46]  On information and belief, Amazon incorporated this feature into its own Operating System.  *See* Exhibit B.  Thus, any Amazon product that runs an operating system that is based on Android 2.3 or higher is an Amazon AMR-WB Product.

80.     On information and belief, the devices listed above are among a larger range of Amazon AMR-WB Products, each of which practices the '805 patent. For example, to the extent

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[42] https://www.androidcentral.com/amazon-fire-phone-specs
[43] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[44] https://developer.amazon.com/docs/fire-tv/device-specifications.html#media-specifications
[45] https://developer.amazon.com/docs/fire-tablets/ft-device-and-feature-specifications.html; https://developer.amazon.com/blogs/appstore/post/Tx1QVJIZG2Y4SJ8/kindle-fire-and-your-app-s-part-ii
[46] https://developer.android.com/about/versions/android-2.3-highlights

that Alexa-enabled products such as the Echo (1st and 2nd Generation), Echo Dot (1st, 2nd and 3rd Generation), Echo Plus (1st and 2nd Generation), Echo Dot Kids Edition, Echo Spot, Echo Show (1st and 2nd Generation), Echo Look, Echo Auto or other Echo or Alexa-enabled products support AMR-WB, those products would be accused Amazon AMR-WB Products. On information and belief, the Echo (1st and 2nd Generation), Echo Dot (1st and 2nd Generation), Echo Plus, Echo Dot Kids Edition, Echo Spot, Echo Show, and/or Echo Look run on Fire OS, which is based on Android OS, and/or Android OS and thus support AMR-WB[47].

81.     As alleged above, Amazon had actual notice of the patents asserted here and of its infringement of these patents.

82.     The Amazon AMR-WB Products directly infringe the '123 Patent.

83.     As another example, the Amazon AMR-WB Products practice representative Claim 102 from U.S. Patent No. 7,191,123.  Claim 102 discloses a device for producing a gain-smoothed codevector during decoding of an encoded wideband signal from a set of wideband signal encoding parameters, said device comprising: means for finding a codevector in relation to at least one first wideband signal encoding parameter of said set; means for calculating a factor representative of voicing in the wideband signal in response to at least one second wideband signal encoding parameter of said set; means for calculating a smoothing gain using a non linear operation based on said voicing representative factor; and means for amplifying the found codevector with said smoothing gain to thereby produce said gain-smoothed codevector.

Each of the Accused Products includes the AMR-WB codec, which comprises the disclosed decoder of representative Claim 102.  The AMR-WB codec decodes a wideband signal and as described, for example, in Section 6 of 3GPP TS 26.190, includes a device for producing a

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[47] https://liliputing.com/2017/05/fun-fact-amazons-echo-devices-run-android-based-os.html

gain smoothed code-vector during decoding. The AMR-WB codec includes a means for finding a codevector in relation to an encoding parameter.  For example, Section 6.1 of 3GPP TS 26.190 describes using a received algebraic codebook index to find the algebraic code vector corresponding to a subframe of speech.  Section 6.1 of 3GPP TS 26.190 further describes calculating $rv = (Ev - Ec)/(Ev + Ec)$, where $Ev$ and $Ec$ are the energies of the scaled pitch codevector and scaled innovation codevector, respectively.  This ratio $rv$ is used to calculate the voicing factor $\lambda = 0.5(1 - rv)$.  This voicing factor corresponds to a value of 0 for purely voiced signals and a value of 1 for purely unvoiced signals.  Section 6.1 describes calculating a gain smoothing factor $Sm = \lambda\theta$ using the voicing factor and a stability factor $\theta$.  For purely voiced signals or for unstable signals, the value of this gain smoothing factor approaches 0.  Section 6.1 further describes using this gain smoothing factor to calculate a smoothed gain value using a nonlinear operation of the form $gc = Smg0 + (1 - Sm)gc$.  If $gc$ is larger or equal to $g\text{-}1$ then $g0$ is computed by decrementing $gc$ by 1.5 dB bounded by $g0 \geq g\text{-}1$.  However, if $gc$ is smaller than $g\text{-}1$ then $g0$ is computed by incrementing $gc$ by 1.5 dB bounded by $g0 \leq g\text{-}1$.  The calculated smoothed gain is used to amplify the algebraic codevector corresponding to the subframe of speech to thereby produce a gain-smoothed codevector.

84.     In addition to its direct infringement, Amazon has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the method claims of the '123 patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing Amazon AMR-WB Products, covered by one or more method claims of the '123 patent, all to the injury of St. Lawrence.  In the case of such infringement, the users of the Amazon AMR-WB Products are the direct infringers of the '123 patent.  Amazon advertises and

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promotes its Amazon AMR-WB Products on its website.[48]   Amazon provides, makes, uses, licenses, sells, and offers its Amazon AMR-WB Products for sale with the specific intent that its customers use those devices in an infringing manner.[49] Amazon sells or offers to sell its Amazon AMR-WB Products for use in practicing St. Lawrence's patented processes, and those are material to practicing St. Lawrence's invention.  The AMR-WB features have no substantial non-infringing uses, and are known by Amazon to be especially made or especially adapted for use in an infringement of St. Lawrence's patents by complying with the AMR-WB standard. Amazon's acts of infringement have been willful, deliberate, and in reckless disregard of St. Lawrence's patent rights.

85.     The acts of infringement by Amazon have caused damage to St. Lawrence, and St. Lawrence is entitled to recover from Amazon the damages sustained by St. Lawrence as a result of Amazon's wrongful acts in an amount subject to proof at trial.   The infringement of St. Lawrence's exclusive rights under the '123 Patent by Amazon has damaged and will continue to damage St. Lawrence.

86.     Upon information and belief, Amazon actually knew of, or was willfully blind to, the existence of the '123 Patent, yet Amazon continues to infringe said patent. For that reason and the reasons described above, the infringement of the '123 Patent by Amazon is willful and deliberate, and with full knowledge of the patent, entitling St. Lawrence to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

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[48]https://www.amazon.com/Amazon-Fire-TV-Family;  https://www.amazon.com/Amazon-Fire-Tablet-Family
[49] https://developer.amazon.com/blogs/home/tag/features;  https://www.amazon.com/Stick-Alexa-Voice-Remote-White/dp/B075911H6L

## JURY DEMAND

87.     St. Lawrence hereby demands a trial by jury on all issues.

## PRAYER FOR RELIEF

WHEREFORE, St. Lawrence requests entry of judgment in its favor and against Defendants as follows:

a. A declaration that Defendants have infringed and are infringing the '805, '524, '802,'521, and '123 Patents;

b. A declaration that Defendants have willfully infringed and are willfully infringing the '805, '524, '802,'521, and '123 Patents;

c. An award of damages to St. Lawrence arising out of Defendants' infringement of the '805, '524, '802,'521, and '123 Patents, including enhanced damages pursuant to 35 U.S.C. § 284, together with prejudgment and post-judgment interest, in an amount according to proof;

d. An award of attorneys' fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law;

e. An award to St. Lawrence of its costs; and

f. such other and further relief, whether legal, equitable, or otherwise, to which St. Lawrence may be entitled or which this Court may order.

Dated:  January 28, 2019

Respectfully submitted,

*/s/ Demetrios Anaipakos*
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